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INTERNATIONAL DIFFERENCES IN FISCAL POLICY DURING THE GLOBAL CRISIS

Agustín S. Bénétrix
Philip R. Lane

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International Differences in Fiscal Policy During the Global Crisis
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ABSTRACT

We examine the cross-country dispersion in fiscal outcomes during 2007-2009. In principle, international differences in fiscal policy may be related to differences in optimal fiscal positions, funding constraints, political economy factors and fiscal control problems. We find that the decline in the overall and structural fiscal balances have been larger for those countries experiencing larger increases in unemployment and where credit growth during the pre-crisis period was more rapid. However, there is no systematic co-variation between fiscal outcomes and a larger number of other macroeconomic variables and country characteristics.

Agustín S. Bénétrix
Department of Economics and IIIS
Trinity College
Dublin
benetria@tcd.ie

Philip R. Lane
The Sutherland Centre
Arts Block
Trinity College Dublin
Dublin 2 IRELAND
plane@tcd.ie

1 Introduction

The aim of this paper is to examine differences in fiscal policies across countries during the 2007-2009 period. While the global financial crisis and global recession has presented many common challenges to countries around the world, it is also the case that national economies have not been uniformly affected by the global shocks (Lane and Milesi-Ferretti 2010). Moreover, there has been considerable dispersion in national macroeconomic policy responses during the crisis period and it is important to understand the sources of these policy differences.

Differences in national fiscal policies can arise for a number of reasons. First, optimal fiscal policies vary across countries in line with differences in initial conditions and basic country characteristics. Second, governments may deviate from optimal policies for country-specific reasons, which may relate to funding constraints, political economy considerations or fiscal control issues.

In relation to optimal fiscal policy, the global crisis has led to a re-surgence of interest in the role of fiscal policy as a macroeconomic stabilisation tool. Central banks have pushed interest rates to near-zero levels, such that many governments have turned to activist fiscal policy in order to combat the negative macroeconomic shock generated by the crisis in credit markets and banking systems. In turn, this has triggered a vigorous discussion about the potential effectiveness of fiscal policy as a stabilisation tool.

In this debate, it was quickly accepted that "one size does not fit all" - the optimal fiscal response to a macroeconomic shock depends on initial conditions and a basic set of country characteristics. In an influential early contribution, Spilimbergo et al (2008) emphasised that the generic recommendation that countries engage in fiscal expansion to combat the global shock is not universally appropriate. In particular, if a country is already burdened by a high debt level or is perceived to have an unsustainable fiscal situation, fiscal expansion may be self-defeating if it results in funding difficulties, higher credit spreads and a decline in consumer and investor confidence.

Moreover, even if a country has the fiscal space to engage in expansion, the optimal extent of fiscal loosening depends on characteristics such as country size and the exchange rate regime. More generally, optimal fiscal policy also interacts with the monetary stance and the health of the banking sector. For instance, a number of authors have highlighted that fiscal multipliers may be larger if interest rates are constrained by the zero lower bound problem (see, amongst others, Christiano et al 2009 and Devereux 2010). Along other dimensions, Barro and Redlick (2009) estimate that the fiscal multiplier is larger if there is slack in the labour market, while Perotti (1999) finds that the level of debt limits the effectiveness of fiscal policy. Finally, Turrini et al (2010) find that fiscal effectiveness

is higher during banking crises, due to the impact of fiscal policy on collateral values.

Cross-country heterogeneity in the effectiveness of fiscal policy is also highlighted by the panel empirical work of Ilzetzki et al. (2010). These authors estimate fiscal multipliers for different groups of countries and show that fiscal multipliers are smaller for poorer economies, more open economies, economies with flexible exchange rates and economies with high public debt levels.

Accordingly, national differences in the optimal fiscal response to a macroeconomic shock may provide one set of explanations for the observed heterogeneity in fiscal behaviour during 2007-2009. In relation to the scope for national deviations from optimal policy, funding constraints, political economy factors and control issues may help to explain the gap between observed fiscal responses and those indicated by models featuring welfare-maximising governments.

As indicated above, fiscal expansion may be self defeating if an increase in the fiscal deficit induces an increase in funding costs and funding risk, raising the cost of capital for private-sector entities and depressing confidence. Accordingly, those countries facing a steeply-increasing credit supply schedule may opt to rein in fiscal plans relative to others that do not face similar funding constraints. While this mechanism has been widely studied in the emerging markets literature and in relation to high-debt episodes among industrial countries during the 1980s, the compression of yields across advanced-country sovereigns during the pre-crisis period means that the re-emergence of funding constraints for this group has been a striking feature of the current crisis.

In addition to funding constraints, fiscal policy may also deviate from due to political economy factors. For instance, an extensive literature has developed on how political economy factors may induce a government to run inappropriately pro-cyclical fiscal policies.[1] During boom periods, the nature of the political equilibrium induces the government to raise spending and cut taxes. In turn, this requires the government to cut spending and raise taxes during downturns in order to ensure fiscal sustainability. For instance, Tornell and Lane (1999) highlight the "voracity effect" mechanism by which political fragmentation means that public spending pressures increase more than proportionally during boom years and fall back during recesssions. Talvi and Vegh (2005) postulate that a budget surplus unleashes intense lobbying pressures to increase public spending or raise taxes. Facing such pressures, the government chooses to raise spending and cut taxes. In contrast, the lower level of lobbying during recessions means that the government restores fiscal health by cutting spending and raising taxes.

[1] A partial list of relevant empirical contributions includes Lane (2003), Galí and Perotti (2003), Talvi and Vegh (2005), Alesina et al (2008) and Fatás and Mihov (2009). See also the review by Golinelli and Momigliano (2009).

In similar vein, Alesina et al (2008) identify an agency problem by which the electorate knows that governments like to divert resources towards politically-favoured elites or 'rents' for politicians but cannot observe the true level of government borrowing (for instance, the government may hide liabilities in off balance sheet entitites). Accordingly, voters require the government to cut taxes or raise spending on public goods during booms, in order to constrain the political temptation to divert boom-year revenues towards transfers for politically-favoured elites or 'rents' for politicians. The mirror image is for the government to raise taxes and cut spending during recessions. In this way, the solution to the agency problem is for voters to call for a procyclical pattern in fiscal policy. While this is suboptimal in terms of the volatility of consumption, it is conditionally efficient in terms of limiting the waste of public resources on socially-useless political rents.

Across the research contributions on fiscal procyclicality, a common refrain is that such political distortions can be mitigated by the existence of effective fiscal rules and fiscal institutions. If fiscal policy is determined in an institutional environment that insulates the common interest from the adverse impact of sectoral lobbying or political rent seeking, such distortions can be neutralised and an optimally counter-cyclical fiscal policy can be implemented. Indeed, the empirical evidence is that fiscal procyclicality is less pronounced in countries with stronger institutions (Woo 2003, Alesina et al 2008). More specifically, there is a body of evidence that indicates that fiscal rules improves the cyclical conduct of fiscal policy. In a panel econometric analysis, European Commission (2009) finds that those countries that adopt stronger fiscal rules are more successful in improving the structural fiscal balance. A similar result is also obtained by Fabrizio and Mody (2006), using a different index for the strength of budget institutions and a different sample of countries.

In addition to funding constraints and political economy factors, observed fiscal outcomes may deviate from optimal fiscal positions due to a loss of fiscal control. Beetsma et al (2009) highlight that implementation failures are a major factor in explaining fiscal outcomes, whereby fiscal balances under-shoot relative to announced plans. One type of control problem relates to unexpected revenue declines, over and above the level projected by developments in GDP and unemployment. In particular, there is evidence that tax revenues are highly sensitive to asset prices and the volume of transactions in asset and housing markets, such that the normal cyclical adjustment is misleading if there is a boom-bust cycle in asset markets (Eschenbach and Schuknecht 2004, Girouard and Price 2004).

A second type of control problem relates to the reversal of planned expenditure reductions or tax increases. A government may announce a fiscal adjustment package, only to roll back on some commitments in the face of lobbying pressures. A third type of control

problem is associated with demand-determined fiscal initiatives (such as car scrappage schemes), where it is difficult to estimate the total cost of a given incentive programme.

Taken together, cross-country differences in optimal fiscal positions, funding constraints, political economy factors and fiscal control problems can help explain the observed variation in fiscal outcomes during the 2007-2009 phase of the global crisis. Using these factors as a guide, our goal in this paper is to examine the co-variates of fiscal outcomes in order to establish whether the international differences in fiscal policy can be related to a set of macroeconomic and institutional characteristics. If such systemic patterns are indeed evident in the data, this can help to identify future priorities for theoretical and empirical research on fiscal policy.

Our focus on the cross-country variation in fiscal outcomes is part of a broader stream of research that seeks to understand international differences in how countries have been affected by the global crisis. In related studies, Lane and Milesi-Ferretti (2010) empirically investigate the co-variates of cross-country differences in growth performance and aggregate demand dynamics during the global crisis, while Giannone et al (2010) relate the cross-country variation in growth to a set of institutional variables.

The structure of the rest of the paper is as follows. In Section 2, we describe our empirical strategy. Section 3 examines the distribution of fiscal outcomes and analyses the bivariate relations between fiscal outcomes and the set of potential co-variates. We turn to regression analysis in Section 4. Section 5 concludes.

2 Empirical Strategy

Our main focus is on analysing cross-country variation in the change in the fiscal balance (expressed as a ratio to GDP) between 2007 and 2009.[2] Differences in the timing of budget processes across countries and in the transmission of the global financial shock mean that it is more insightful to consider the shift in the fiscal position over a two-year window rather than examining cross-country variation in fiscal behaviour at a higher frequency. In our robustness analysis, we also examine alternative scaling factors for the fiscal balance.

For the advanced economies, we also consider the change in the structural fiscal balance, in addition to the overall balance. However, estimates of the structural balance are not widely available for the broader sample that includes emerging market economies. Moreover, an accurate decomposition of the overall balance between structural and cyclical elements is subject to a high degree of uncertainty, especially in view of the special features of the current downturn.

[2]Furthermore, it is worth noting that there is also a very high correlation between fiscal balances in 2009 and the projected fiscal balances for 2010.

In addition, we separately examine the revenue and expenditure sides of the fiscal balance for the advanced economies. In this way, we may obtain extra insight into the driving forces behind the dynamics of the overall balance.

We model the optimal fiscal response to the global crisis as varying across countries in line with a set of macroeconomic variables and country characteristics

$$\Delta FBAL_i^* = \alpha_1 + \mu_1 GROW_i + \beta_1 X_i + \varepsilon_{1i} \tag{1}$$

where $GROW_i$ is the growth of GDP and X_i is a set of other potential determinants of the optimal fiscal response. In line with the discussion in the previous section, we experiment with a range of candidate variables. These include the shift in the unemployment rate as another contemporaneous variable. In common with the GDP growth rate, these variables are surely endogenous to the fiscal position but we do not attempt to sort out causality at this juncture. Rather, we include these variables since we want to ensure that the other regressors are not operating solely through these channels.

In addition, we draw from a list of pre-determined variables. These include the 2007 level of GDP per capita, the 2007 debt/GDP ratio, the level of trade openness, country size, the exchange rate regime and the level of international financial integration.

The level of per capita output may matter for several reasons. In one direction, it is plausible that credit constraints are more extensive among households and firms in lower-income countries, suggesting that fiscal policy may be powerful in these countries (see, amongst others, Lane and Milesi-Ferretti 2002). In the other direction, lower-income countries may be perceived as higher credit risks, limiting the ability of these countries to fund large fiscal deficits. In addition to these conflicting forces, the financial crisis was more severe in more-developed economies, such that the impetus for fiscal intervention may have been stronger in richer economies.

A high outstanding level of public debt may constrain the fiscal response due to concerns about fiscal sustainability. We include trade openness, since open-economy macroeconomic models project that the effectiveness of fiscal policy is lower in more open economies due to the lower sensitivity of domestic production to the level of domestic demand. In similar vein, fiscal effectiveness may be more limited for smaller countries. Moreover, smaller countries may face more severe funding constraints, in view of the more limited scope to issue local-currency debt instruments to international investors.

We include the exchange rate regime as another candidate variable, since the macroeconomic impact of fiscal policy depends on the exchange rate response to a fiscal shock. To the extent that fiscal expansion induces currency appreciation, fiscal policy may be less effective under a flexible exchange rate regime relative to a fixed exchange rate regime (or

membership of a currency union) as a result of the offsetting impact of currency appreciation. However, in the other direction, if fiscal expansion is accomodated by monetary loosening under a float, this ordering may be reversed. In addition, a fixed exchange rate (or currency union) may impose constraints on the conduct of fiscal policy in order to copperfasten the credibility of the regime, such that fiscal policy may be tighter under a peg or currency union relative to a floating-rate regime.

We also examine the level of international financial integration as a potential co-variate of fiscal policy. A high degree of international financial integration may exert a discipline effect on the conduct of fiscal policy (Kose et al 2009). In the other direction, financial integration may improve the sovereign's access to debt markets in view of the presumed higher default penalty for financially-integrated economies.

In addition to this set of pre-determined variables, we also examine some additional contemporaneous variables. Since reverse causation is a more obvious problem for these variables, we report these in a separate set of regressions. The goal in this case is to establish the co-variates of fiscal policy, while recognising the bi-directional nature of causation for these variables. We consider five variables in this set. First, we examine the change in the ten-year government bond yield during 2007-2009. While the bond yield is obviously a function of the fiscal position, it is also the case that market funding signals influence fiscal choices, with a sharp increase in the spread a potent influence in the direction of greater fiscal restraint.

Second, we look at the change in the real exchange rate over 2007-2009. This is in order to establish whether the de facto level of easing provided by the real exchange rate co-varies with the fiscal position. Third, we look at downgrades in the sovereign credit rating. As with the bond yield, there are bi-directional influences in the relation between rating downgrades and the fiscal position.

Fourth, we ask whether there is co-variation between the incidence of banking crises and the fiscal position. In one direction, the evidence of Reinhart and Rogoff (2009) is that banking crises are associated with significant deterioration in fiscal positions. In the other, a banking crisis may trigger an increase in funding costs for the sovereign, limiting the scale of fiscal expansion. Finally, we ask whether those countries with IMF programmes display different fiscal behaviour to other countries. Again, we can think of opposing forces: while the existence of an IMF programme may reflect fiscal weakness, the availability of non-commercial financing may facilitate a larger fiscal deficit than would otherwise be possible.

We also expect that observed fiscal outcomes will differ from optimal fiscal positions due to political economy distortions and fiscal control issues

$$\Delta FBAL_i - \Delta FBAL_i^* = \alpha_2 + \sigma Z_i + \varepsilon_{2i} \tag{2}$$

where the Z_i vector includes an index of decision-making constraints in the political system, the existence of fiscal rules and the scale of financial imbalances during the run up to the crisis.

Our measure of checks and balances in the political system is the political constraints index developed by Henisz (2000), which is regularly updated. This variable has been used in the fiscal literature by Lane (2003) and Fatas and Mihov (2003), with the notion that fiscal procyclicality may be abetted by a larger number of veto points in the political system - with the fragmentation of political power, it is more difficult to generate the surpluses during good times that provide the fiscal space for activist fiscal expansion in response to negative macroeconomic shocks. (In the other direction, a large number of veto points can improve the stability of fiscal policy by reducing the likelihood of discretionary fiscal interventions.) In relation to fiscal rules, we focus on those rules that limit the accumulation of public debt.[3] If such rules are binding, this may limit the fiscal response to the crisis.

Following Lane and Milesi-Ferretti (2010), financial imbalances are measured by the 2007 current account balance and the rate of private-sector credit growth during 2003-2007. The presumption is that high capital inflows and rapid lending growth may have generated revenue windfalls during the pre-crisis period due to the associated wealth and balance-sheet effects on consumption and investment, in addition to the revenues directly generated by financial transactions, capital gains taxes and taxes on financial-sector profits. Once the crisis hit, these windfall revenues may have plunged, leading to an unplanned deterioration in the fiscal balance.

It is also important to highlight that these pre-crisis financial imbalances may also operate through an additional channel. In particular, financial imbalances may be associated with an increase in funding risk and funding costs for governments during the crisis period itself, due to concerns about post-crisis growth prospects, the socialisation of banking-sector losses and the feasibility of fiscal adjustment.

It is also important to recognise that the Z_i vector plausibly overlaps with the X_i vector, since variables such as the unemployment rate and country size may operate through funding constraints or political economy channels in addition to their impact on optimal fiscal policy. Accordingly, the reduced-form equation for the fiscal balance may be written as

$$\Delta FBAL_i = \alpha + \mu GROW_i + \beta X_i + \sigma Z_i + \varepsilon_i \tag{3}$$

[3]We also investigated fiscal rules that limit expenditure growth.

where the estimated coefficients may reflect multiple channels by which the regressors co-vary with the fiscal balance.

We consider two samples. The narrow sample consists of twenty-two advanced economies, while the broader sample additionally includes thirty emerging market economies. Table 1 lists the countries in these samples. The advantage of the narrow sample is greater data availability and similarity in economic characteristics; the broader sample offers more degrees of freedom and greater variation in the key variables.

3 Data and Bivariate Analysis

As a first pass at the data, we compare the fiscal outcomes during 2007-2009 to previous fiscal experience. Next, we examine the cross-country distribution of changes in the fiscal position during the crisis. Subsequently, we report a set of bivariate relations, linking fiscal behaviour to a range of macroeconomic and institutional variables.

Table 2 compares the distribution of the shift in fiscal balances during 2007-2009 to previous periods (for the advanced-country sample). The mean decline in the fiscal balance is 7.1 percentage points of GDP - the next largest in the sample is the 3.3 percentage point mean shift in 1973-1975. Moreover, the cross-sectional standard deviation in 2007-2009 is larger than in any previous two-year interval during the 1973-2007 period.

In Table 3, we compare fiscal outcomes for individual countries compared to historical experience. For fifteen out of the twenty-two advanced countries, the decline in the fiscal balance during 2007-2009 is larger than in any previous two-year period since 1973.

Figure 1 plots the cross-country density function for the change in the fiscal balance between 2007 and 2009 for two groups: (a) the set of 22 advanced economies; and (b) the broader set of 52 advanced and emerging economies. The data show that the advanced country group had a larger fiscal deterioration than the broader group. Taking the full set of countries, only one country experienced an improvement in the fiscal balance between 2007 and 2009, with the Hungarian position improving by one percentage point of GDP. At the other extreme, Iceland had the largest fiscal decline at 17.8 percentage points of GDP.

Figure 2 plots the actual 2009 fiscal balances against the 2009 balances that were projected in 2007, with the upper panel showing the overall balance and the lower panel the structural balance. The data show that the decline in fiscal balances was largely unexpected (relative to expectations in 2007), with all countries to the right of the 45 degree line. Moreover, the surprise element was larger for the structural balance than for the overall balance.

Figure 3 shows a strong connection between output dynamics during the crisis and

fiscal developments, with those countries exhibiting a larger decline in GDP typically having a larger expansion in fiscal deficits. However, Figure 3 also illustrates that there is also considerable dispersion in fiscal outcomes for a given GDP performance, such that other factors have also been influential in determining fiscal dynamics.

Next, we examine the bivariate relations between the shift in the fiscal balance and a host of economic and institutional variables by comparing the values between the upper and lower terciles of the fiscal distribution.[4]. We label these the *Upper* and *Lower* terciles, based on the scale of the general government balance deterioration. The former group contains countries with the largest decline in the fiscal balance, while the latter group contains those with the smallest fiscal declines. Table 4 shows the statistics for the advanced country group, while 5 shows the statistics for the broader "advanced plus emerging" group. The tables report the mean and median values for each variable for the upper and lower terciles. In addition, the final column shows the difference in means across the upper and lower terciles and reports whether the difference is statistically significant.

Table 4 shows that the mean decline in the fiscal balance was 7.4 percentage points larger for the Upper tercile compared to the Lower tercile among the advanced countries. While public spending grew more quickly for the former group, the mean difference is not statistically significant and is much lower than the mean difference in revenue growth across the terciles. Indeed, the Lower tercile only experienced an average revenue decline of 0.8 percent, while the average revenue decline the Upper tercile was a striking 21.7 percent.

Row (4) shows that there was a large proportion of the fiscal decline was structural in nature, with the decline in the structural balance 5.8 percentage points larger for the Upper tercile than for the Lower tercile. It is important to emphasise that the variation in fiscal balances bears little relationship to the announced discretionary fiscal stimulus plans — row (5) shows that fiscal stimulus packages were quite small and did not differ significantly across terciles.

In relation to macroeconomic performance, row (6) shows that the difference in the scale of the GDP contraction across the terciles is not statistically significant. However, as is recorded in row (7), the Upper tercile experienced an average increase in the unemployment rate of 4.4 percentage points, whereas the mean unemployment rate for the Lower tercile only grew by 0.7 percentage points.

Next, we turn to a set of country characteristics in terms of the state of the economy at the beginning of the crisis in 2007. Rows (8)-(12) show that richer countries experienced a

[4]For the advanced country group, we report the data for the seven countries at each end of the distribution, excluding the middle eight countries. For the advanced plus emerging group, we report the data for the seventeen countries at each end of the distrubiton, excluding the middle eighteen countries.

bigger decline in fiscal balances than poorer countries but also that there are not significant differences across terciles in terms of the pre-crisis level of public debt, the level of trade openness, country size or the exchange rate regime.

However, rows (13)-(14) highlight that the terciles significantly differed in terms of external balances and the scale of credit growth during the pre-crisis period. Whereas the mean current account balance for the Lower tercile in 2007 was a surplus of 2.8 percent of GDP, the mean current account balance for the Upper tercile was a deficit of 5.7 percent of GDP. Similarly, there is striking difference in terms of credit growth during the pre-crisis period - the Lower tercile saw an average expansion of 13.9 percent over 2003-2007, whereas it was 56.6 percent for the Upper tercile. Accordingly, the decline in fiscal positions may be connected to the cross-country incidence of financial imbalances during the pre-crisis period.

Rows (15)-(16) consider whether fiscal institutions and the design of the political system made a difference to fiscal dynamics during the crisis. Fiscal rules restricting the dynamics of public debt are more prevalent in the Lower tercile than in the Upper tercile but the difference is not statistically significant. However, the Upper tercile on average have political systems with fewer checks and balances than the Lower tercile.

Rows (17)-(23) examine whether there are clear differences across the terciles in how other key macroeconomic and financial variables unfolded during the crisis. While inter-tercile differences are typically not significant for most of these variables, the Upper tercile experienced significant real depreciation compared to the Lower tercile. In addition, the Upper tercile experienced a sharp current account reversal, whereas the Lower tercile saw a slight decline in the external balance. In relation to the other variables, both terciles experienced a decline in ten-year bond yields. Banking crises and downgrades in sovereign credit ratings have been more prevalent in the Upper tercile (in fact, no country in the Lower tercile experienced a rating downgrade during 2007-2009). For the advanced country group, only Iceland (in the Upper tercile) entered an IMF program during 2007-2009.[5]

Table 5 conduct the same exercise for the extended sample that includes both advanced and emerging economies. Many of the data patterns are quite similar to those in Table 4 but some important differences do emerge. First, GDP growth is significantly lower for the Upper tercile in this broader sample, while the Upper tercile is also characterised by a higher average GDP per capita. The rate of pre-crisis credit growth remains significantly different across the terciles, but the inter-tercile difference in pre-crisis current account balances is not significant for the broader sample. Banking crises and rating downgrades

[5]The Greek program was only initiated in the first part of 2010, which falls outside the scope of our study.

are significantly more prevalent for the Upper tercile than for the Lower tercile. The average ten-year bond yield actually increased for the Upper tercile and fell for the Lower tercile but the difference in means across the groups is not significant. Finally, we note that output growth in trading partners was significantly worse for the Upper tercile group than for the Lower tercile group and that the Upper tercile are more financially integrated than the Lower tercile.

In summary, the bivariate analysis highlights some useful patterns in the data. For the advanced-country group, larger declines in the fiscal balance have a large structural component and reflect bigger contractions in public revenues. Moreover, larger declines in the fiscal balance are pairwise correlated with bigger increases in the unemployment rate, higher output per capita, more rapid pre-crisis credit growth, larger pre-crisis current account deicits and fewer checks and balances in the political system. Finally, those advanced countries experiencing larger fiscal declines also underwent more real exchange rate depreciation and a larger turnaround in the current account balance during the crisis. Albeit with some refinements, very similar data patterns also are found for the broader sample of advanced plus emerging economies.

In the next section, we move beyond bivariate analysis and report the results of multivariate regression estimates.

4 Regression Evidence

As in the previous subsection, we separately consider results for the narrow sample of advanced economies and the broad sample that includes both advanced and emerging economies. All regressions are cross-sectional and are least-square estimates (with robust standard errors). The main focus is on examining the covariates of the shift in the general government balance (scaled by GDP) between 2007-2009. However, we will also discuss in detail the results for a variety of other dependent variables.

4.1 The Overall Fiscal Balance

Tables 6-7 show the results for the advanced sample, while Table 8-9 show the results for the broader advanced plus emerging sample.

We begin in Table 6 by examining the co-variation between the shift in the fiscal balance and a limited set of country characteristics. Each specification includes output growth from 2007 to 2009 as a general control variable. The simple bivariate regression of the change in the fiscal balance on output growth in reported in column (1) — while output growth is significant at the 10 percent level, 88 percent of the cross-country variation in

the fiscal position is uncorrelated with output growth. Column (2) adds the change in the unemployment rate between 2007 and 2009. The unemployment variable is highly significant and renders the output growth rate individually insignificant; moreover, the R^2 jumps from 0.12 to 0.54. The strong significance of the unemployment variable meant that we opted to include this variable in all other specifications in Table 6. Figure 4 shows that there is a significant negative correlation between output growth and the change in the unemployment rate (for the broad sample of countries) but also that there is considerable variation in unemployment performance for a given interval of growth outcomes.

In columns (3)-(9), we add other variables on a sequential basis. (In column (5), we jointly add the current account balance and pre-crisis credit growth since we view this pair of variables as jointly proxying for pre-crisis imbalances.) The focus in this table is on pre-crisis indicators (the initial debt-output ratio, current account balance, the pre-crisis rate of credit growth) and on relatively-fixed policy regime and institutional variables (trade openness, country size, exchange rate regime, political orientation of the government, the existence of a debt-focused fiscal rule), since these variables may be viewed as generally pre-determined in relation to the shift in fiscal balances between 2007 and 2009. It turns out the only variables that are individually significant are the pre-crisis rate of credit expansion in column (5) and the political constraints index in column (8). Those countries that experienced credit booms during the pre-crisis period experienced a substantially larger decline in the fiscal balance, while more checks and balances in the political system is associated with a smaller fiscal decline. It is important to highlight that the relation between credit growth and fiscal outcomes is a partial correlation, since Lane and Milesi-Ferretti (2010) also show that faster credit growth during the pre-crisis period is associated with a larger output decline during the crisis period. We also note that the R^2 in column (5) is 0.75, which is a large jump relative to the R^2 of 0.54 in the benchmark regression in column (2).

In column (10), we jointly enter both pre-crisis credit growth and the political constraints index. Both are individually significant in this expanded regression.

As was discussed in the introduction, it is possible that some of these country characteristics may affect the sensitivity of the fiscal balance to output growth. We explored this by adding interaction terms between output growth and the other regressors on a sequential basis. However, none of these interaction terms turned out to be significant.

In Table 7, we examine a different set of regressors, while retaining output growth and the change in the unemployment rate as core variables in the specification. In Table 7, the focus is on co-variation between the shift in the fiscal balance and contemporaneous shifts in other key macroeconomic variables during the crisis period. In this case, it

is not feasible to establish the lines of causality between the fiscal position and these simultaneously-determined variables.

We consider four variables: the ten-year bond yield; downgrades to the sovereign credit rating; the real exchange rate; and a banking crisis dummy variable. While there is no significant co-variation between the change in the ten-year bond yield or the banking crisis dummy and the shift in the fiscal balance, the shift in the real exchange rate is only marginally insignificant (with the sign being that fiscal deterioration is associated with real depreciation). In contrast, there is evidence of strong co-variation between fiscal decline and ratings downgrades, with fiscal deterioration clearly one factor driving rating decisions.[6]

We next turn to the expanded sample that includes both advanced and emerging economies, with the results reported in Tables 8 and 9. The specifications are very similar to those in Tables 6 and 7. The main exception is that we add the level of GDP per capita to the benchmark specification, in view of the large differences in the level of development across this sample and the high correlation between GDP per capita and many other institutional characteristics. In addition, we also include an indicator of international financial integration in row (11) of Table 8 . The motivation is that, whereas all advanced economies have a high degree of effective integration with the global financial system, some emerging market economies have relatively low holdings of cross-border assets and liabilities (Lane and Milesi-Ferretti 2007, 2008).

For many specifications, the results for the extended sample in Table 8 are similar to those for the advanced country sample in Table 6. One difference is that the GDP growth rate is significant across the specifications for the broader sample. In addition, the level of GDP per capita is highly significant across columns (3)-(11) and its inclusion doubles the overall explanatory power from 0.20 in column (2) to 0.41 in column (3). The unemployment rate and the rate of pre-crisis credit growth remains highly significant in this broader sample. The main difference is that the political constraints index is not individually significant in this broader sample. We note that the fiscal rule variable is only marginally insignificant in column (10) and that the international financial integration dummy is not significant in column (11).

The next set of regressions is reported in Table 9. None of the additional regressors are individually significant for this broader sample.

In Tables 6-9, the fiscal balance has been measured as a ratio to GDP. In order to check that the results are not simply driven by changes in the denominator (GDP), we also ran the regressions for an alternative measure of the fiscal balance. We constructed

[6]We again tried interaction effects between these variables and output growth. However, none of these interaction effects were significant.

$FBAL^{ALT} = REV/EXP$ and examined the shift in $FBAL^{ALT}$ between 2007 and 2009. The results are very similar for this alternative measure, with the natural exception that GDP growth itself is typically less significant as a regressor.[7]

4.2 The Structural Balance

In Tables 6-9, the focus has been on the overall fiscal balance. In order to strip out the impact of automatic stabilisers, it is also useful to examine the shift in the structural fiscal balance in Tables 10 and 11. (This is only feasible for the advanced-country sample.) A shift in the structural balance can arise if governments initiate new spending programmes or tax reductions that are not automatically undone by a return to potential output. In addition, the structural deficit can increase if there is a decline in some types of tax revenue that are not projected to recover in line with GDP.

Column (1) of Table 10 shows that the shifts in the structural balance bear little relation to developments in GDP growth. However, there is significant co-variation between the shift in the unemployment rate and the structural balance: the addition of the unemployment rate in column (2) leads to an increase in overall explanatory power from 0.03 to 0.37. As in Table 6, the pre-crisis rate of credit growth and the political constraints index are each individually significant in columns (5) and (8) respectively. However, only credit growth remains individually significant in the expanded specification in column (10).

We examine the co-variation between the set of contemporaneous macroeconomic variables and the structural balance in Table 11. The only individually significant variable is the real exchange rate - real depreciation is associated with a larger decline in the structural balance. The rating downgrade variable is only marginally insignificant in column (2).

In summary, it appears that the unemployment rate operates not only through the measured cyclical component of the budget but also through the structural element. In addition, the rate of pre-crisis credit growth is also associated with a decline in the structural balance. Those economies experiencing real depreciation have also seen a decline in the structural balance.

[7] These results are available upon request from the authors.

4.3 Shifts in Revenues and Public Spending

Next, we ask whether the patterns for the overall fiscal balance can be systematically related to the individual evolution of revenues and public spending.[8] We ran the same set of specifications as in Tables 6-9 for revenue growth and expenditure growth.[9] We measured growth in two ways. First, we calculated revenue and expenditure growth in real terms (deflated by the GDP deflator). Second, in order to provide comparability to the measure of the fiscal balance, we also examined shifts in the ratios of revenues and expenditure to GDP.

In relation to the former measure and taking first the advanced-country sample, we find that the change in the unemployment rate is typically associated with a significant decline in revenues. Only when we control for private credit growth is unemployment a significant covariate with expenditure growth. Private credit growth is highly significant in both revenue and expenditure equations - it is significantly associated with both a decline in revenues and a decline in expenditure. In relation to the other regressors in Table 6, the initial debt-GDP ratio is significantly associated with both faster revenue growth and faster expenditure growth; the only other variable that is individually significant is that smaller countries experienced slower expenditure growth. In relation to the contemporaneous variables examined in Table 7, real exchange rate depreciation is significantly associated with both lower revenues and lower expenditure.

If revenues and expenditure are scaled relative to GDP, there are some differences in results. First, both GDP growth and the shift in the unemployment rate are significant across the specifications in being associated with a decline in the revenue ratio and an increase in the expenditure ratio. Private credit growth is significantly associated with an increase in the expenditure ratio but not with the revenue ratio. In terms of the other variables, more open economies experienced a smaller decline in the revenue ratio. In relation to the contemporaneous variables, rating downgrades significantly co-vary with a reduction in the revenue ratio and an increase in the expenditure ratio, while real exchange rate depreciation is associated with a decline in the revenue ratio.

For the broader sample, the real growth rates of revenues and expenditure significantly covary with several variables. Private credit growth is associated with lower growth in both revenue and expenditure, while more flexible exchange rate regimes are also associated with lower revenue and expenditure. In addition, more financially integrated economies experience more rapid expenditure growth. In relation to the contemporaneous

[8] This is a useful but limited exercise. In particular, the cross-section dispersion in the fiscal balance depends on the cross-sectional covariance between revenues and expenditure in addition to the individual cross-section distributions of revenues and expenditure.

[9] These results are available upon request from the authors but are not included in the paper in order to conserve space.

variables, real exchange rate depreciation and the existence of an IMF programme covaries with slower revenue and expenditure.

If we examine revenue and expenditure ratios for the broader sample, some different patterns emerge. Pre-crisis private credit growth is associated with a lower revenue ratio and higher expenditure ratio, while more financially integrated economies see a larger decline in the revenue ratio. Among the contemporaneous variables, banking crises are associated with a decline in the revenue ratio, while the existence of an IMF programme is associated with a decline in expenditure ratio.

Some of these individual results may warrant further investigation in studies that are more directly focused on the cross-country distributions of revenues and expenditure. In relation to understanding the evolution of the overall fiscal balance, the key results are that slower GDP growth and an increase in the unemployment rate are both associated with a decline in the revenue ratio and an increase in the expenditure ratio. Moreover, the rate of pre-crisis private credit growth is associated with an increase in the expenditure ratio for both samples and a reduction in the revenue ratio for the broader sample.

Finally, it would also be informative to examine the composition of the revenue decline between 2007 and 2009. In particular, it is plausible that the pre-crisis credit growth variable is in part a proxy for boom conditions in local asset and housing markets. During the crisis, asset-related revenues were especially hit in a number of countries due to reversals in asset prices and a decline in the volume of asset transactions. However, reversals in asset markets may also operate more broadly through wealth effects on consumption and the impact on investment levels. While the decomposition of tax revenue for 2009 is not yet available, an inspection of the composition of the decline in revenues between 2007 and 2008 shows substantial variation across countries. Among those countries experiencing the most severe crises, indirect taxes were the most important source of the revenue decline in Iceland, while it was individual income taxation in Ireland and corporation tax in Spain. The direct contribution of asset-related taxes was a contributory factor but was too small to be the dominant factor.

4.4 Robustness

In this subsection, we further report on alternative specifications and alternative estimation methods. For data availability reasons, we focus on the advanced-country sample. To conserve space, most of these results are not shown in tabular format but are available upon request.

First, the unemployment rate may not be a sufficient indicator for the state of the labour market. In particular, adjustment may also take the form of a reduction in hours

worked and this option has been promoted through "short-time" initiatives in some countries (as in Germany). Accordingly, we included the change in hours worked between 2007 and 2009 as a regressor. If it is entered as a substitute for the unemployment rate, it is never individually significant. If it is entered in addition to the unemployment rate, it is only significant (at the 10 percent level) in the specifications shown in columns (8) and (10) of Table 6 but otherwise it is not individually significant. Accordingly, there is some partial evidence that a decline in hours worked is associated with a more negative fiscal balance, over and above the role played by the unemployment rate.

Second, we have not controlled for differences in monetary policy across countries (except via the inclusion of the exchange rate regime dummy). We ran regressions in which the change in the policy nominal interest rate between 2007 and 2009 was included as an additional explanatory variable. The policy rate was never significant and its inclusion did not affect the other results. This reflects the limited cross-country variation in policy rates for the advanced countries during 2007-2009, since all countries engaged in significant interest rate cuts. A further factor is that the policy rate is common for all members of the euro area, such that monetary policy cannot help to explain intra-area variation in fiscal outcomes.[10]

Third, our regressions so far have focused on the relation between domestic variables and domestic fiscal outcomes. We also explored whether foreign variables provided additional explanatory power by adding foreign output growth and the foreign fiscal outcome (separately and jointly) as additional regressors, where these variables were measured as weighted averages across trading partners. Since our regressions already include domestic output growth and the domestic unemployment rate, the foreign variables may already indirectly contribute through their influence on the domestic macroeconomic and fiscal environment and any additional role must operate through some other mechanisms. It turns out that these variables are not significant in most specifications and do not affect the significance of the other regressors. The exceptions are that the foreign fiscal balance is significantly positive (at the ten percent level) in the specifications corresponding to columns (9) and (10) in Table 6 if foreign output growth is excluded and in the specifications corresponding to columns (8) and (10) in Table 6 if foreign output growth is included. The mechanism by which the foreign fiscal balance matters in these specifications is not clear, especially in view of the host of other regressors in the specification.

[10] As an alternative, we also ran regressions with the change in the ex-post real interest rate as an explanatory variable (the policy rate minus realised inflation). This was significantly positive - lower real rates being associated with worse fiscal outcomes. Moreover, the inclusion of the real rate rendered private credit individually insignificant. Upon closer inspection, it turns out that the significance of the real rate is entirely driven by Iceland, since it experienced both a sizeable surge in inflation and a severe fiscal deterioration.

So far, we have reported least-squares estimates, without addressing the potential endogeneity of output growth and the unemployment rate to the fiscal balance. We next report instrumental-variables estimates. We use the pre-crisis values of a set of instruments. Lane and Milesi-Ferretti (2010) find roles for the 2007 values of the manufacturing share in output, the trade share and the level of GDP per capita in explaining the cross-country variation in output growth during 2007-2009 and we include these variables in our instrument list. Furthermore, structural characteristics of the labour market may also have influenced unemployment dynamics during the crisis. Accordingly, we also include the ratio of temporary to permanent employees, the OECD employment protection legislation (EPL) index and the 2007 level of the unemployment rate in the instrument list. These instruments perform well in first-stage regressions for output growth and the change in the unemployment rate and the Kleibergen-Paap rk statistic indicates these are sufficiently strong instruments and span the two endogenous regressors.

We report IV estimates for the overall fiscal balance equation in Table 12 and the structural fiscal balance equation in Table 13 (correspoding to the least-squares estimates reported in Table 6 and Table 10). The IV estimates in Table 12 are qualitatively quite similar to those in Table 6, with the exception that GDP growth enters with a negative sign in most regressions (but insignificantly). The only change in terms of significance is that GDP growth is now marginally significant in columns (2) and (7). The absolute value of the point estimate for the coefficient on the unemployment rate is larger in most of the cases.

Turning to the IV estimates for the structural balance in Table 13, these are again quite similar to those in Table 10 for most variables. Output growth is now significantly negative in most specifications, while the unemployment rate is no longer individually significant in column (5). The negative sign on output growth may reflect the fact that those economies suffering the worst output declines had structural balances that were already large in 2007 and were less able to engage in the types of fiscal stimulus programmes that increase the structural deficit.

Finally, it is useful to establish whether the relations between the regressors and fiscal outcomes during 2007-2009 are different to previous intervals. Accordingly, we ran a pooled regression over four two-year intervals (2001-2003, 2003-2005, 2005-2007 and 2007-2009) where we allow the coefficients during the crisis period to differ from the other periods.

The results are reported in Table 14. The pooled regression shows that the links between fiscal outcomes, GDP growth and the unemployment rate during the crisis were similar to those in previous intervals. This is also true for the role played by the political constraints index. However, the lagged rate of private credit growth is only significant

during the crisis period. In addition, the role played by the lagged level of public debt also changes sign during the crisis period. During previous intervals, there is a positive relation between the lagged level of public debt and the improvement in the budget balance. In contrast, the pooled estimates indicate that more indebted countries experienced worse fiscal outcomes during the crisis.

5 Conclusions

The aim of this paper has been to explore the international differences in fiscal outcomes during the 2007-2009 phase of the global crisis. This episode is especially important in view of the scale of the shift in fiscal positions and the heterogeneity in fiscal policies across countries.

Our results indicate that the shifts in fiscal balances can be systematically related to changes in the unemployment rate and the rate of pre-crisis private credit growth. In addition, there is some evidence that political systems with more checks and balances experienced a smaller decline in the fiscal balance. Since these variables significantly co-vary with measures of the structural balance, the mechanisms linking these variables to fiscal outcomes cannot be simply attributed to purely cyclical factors. Moreover, the relation between lagged private credit growth and fiscal outcomes was significantly different during the crisis relative to more normal periods. In the broader sample, fiscal balances are also significantly related to the level of GDP per capita - the decline in the fiscal balance was larger in richer economies.

In general, most other variables that we have examined turned out not to be individually significant in multi-variate regressions even if a number showed significant bivariate covariation with fiscal outcomes. It is not too surprising that some of these variables were not significant, in view of the multiple and opposing channels by which these variables may be linked to fiscal outcomes.

A limitation of our approach is that we cannot disentangle the different mechanisms by which the regressors inter-relate with fiscal outcomes. It would be desirable to establish whether the observed co-variation patterns reflect differences in optimal fiscal policy, funding constraints, political economy factors or fiscal control issues. For instance, the significant co-variation between unemployment and fiscal outcomes calls out for further analysis of the channels by which labour market conditions have affected fiscal policy during the crisis.

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Appendix: Data sources and definitions

Fiscal variables

The fiscal balance measure is the difference between general government balance scaled by GDP in 2009 and 2007. These data are obtained from the 'Fiscal Monitor' document, published the 14th of May 2010 by the International Monetary Fund. This includes fiscal data from the World Economic Outlook database published in April 2010 and other IMF sources. Expenditure and revenues are real growth rates between 2007 and 2009 for general government expenditure and general government revenues. To compute these we take general government expenditures are revenues (scaled by GDP) from the IMF Fiscal Monitor. We transform these into real growth rates using current GDP in million of U.S. dollars and GDP deflator from the World Economic Outlook. Structural government balance is the difference between cyclically adjusted revenues and expenditure. The source is the OECD Economic Outlook No. 86. Current and projected fiscal balance in Figure 2 are from the OECD Economic Outlook. Current data are from the December 2009 vintage (No.86). Projected data are from the December 2007 vintage (No.82).

GDP growth

GDP growth is the growth in real output between 2007 and 2009. The source of these data is the IMF World Economic Outlook, April 2010.

Unemployment

Unemployment is the difference in the unemployment rate in 2007 and 2009. We collect these data from different sources. For advanced countries we use the OECD Economic Outlook No. 86. Data for eastern European countries are from Eurostat. For the rest of the countries we use the Labour Statistics Database (LABORSTA) from the International Labour Organization, the World Bank World Development Indicators and the The World Factbook from the CIA.

GDP per capita

For GDP per capita we take 2007 figures. The source is Penn World Tables 6.3.

Debt

For government debt we use the 2007 ratio of general government gross debt to GDP. The source is the IMF Fiscal Monitor. This document uses WEO as its main source.

Openness

We define openness as the logarithm of ratio between total exports plus imports scaled by GDP in 2007. The source of these data is the IMF Direction of Trade Statistics (DOTS) and the World Bank World Development Indicators.

Country size

To measure country size we include population figures for 2008. The source of these data is the World Economic Outlook, April 2010. The regression analysis uses the logarithm of population.

Exchange rate regime

This is a dummy variable that takes value =0 for the European Monetary Union member countries, Denmark and countries with exchange rate regime index =1 or =2 in the Ilzetzki et al (2008) coarse exchange rate classification. It takes value =1 otherwise.

Credit growth

We measure credit growth by taking 'claims on the private sector by deposit money banks and other financial institutions' from the recently compiled database on financial structure by Thorsten et al (2010) at the World Bank. These data are scaled by GDP. We take the difference between the 2007 and the 2003 ratios.

Current account balance

We use the current account over GDP ratio for 2007 and the difference in current account scaled by GDP in 2009 and 2007. The source of these data is the World Economic Outlook, April 2010.

Fiscal rule

Fiscal rule is a dummy variable indicating that a national level debt fiscal rule is in place. The source of these data is Debrun et al (2008).

Political constraint index

This is the political constraints index developed by Henisz (2000).

International financial integration (IFI)

IFI is defined as the sum of foreign assets plus foreign liabilities scaled by GDP in 2007. In the regressions, we include a dummy variable indicating that the country is integrated to the international financial markets. It takes value =1 if the sum of foreign assets plus foreign liabilities scaled by GDP is greater than 150. It takes value =0 otherwise. The source of foreign assets and liabilities is Lane and Milesi-Ferretti (2001, 2007).

Bond yield

This is the difference between the 2009 and 2007 ten year government bond nominal yields. The sources of these data are OECD Economic Outlook No. 86, International Financial Statistics from the IMF, The Annual Macro-economic Database (AMECO), Eutostat, Global Financial Data and national sources.

Rating downgrade

This is a dummy variable that takes value =1 if government bonds denominated in foreign currency are downgraded and =0 otherwise. The source of these data is Moodys.

Real exchange rate

For this variable we take the change in the real effective exchange rate index between 2007 and 2009 (increase means real appreciation). The source of these data is the IMF International Financial Statistics.

Banking crisis

This is a dummy variable that takes value =1 for Iceland and for countries with total net expected cost from financial support measures greater that 3 percent of GDP and =0 otherwise. These are obtained from Table 4 of the IMF Companion Paper - 'The State of Public Finances: Outlook and Medium-Term Policies After the 2008 Crisis,' March 2009.

IMF program

This is a dummy variable that takes value =1 if the country is has an IMF support program in place and =0 otherwise. The source of these data is the IMF.

ROW growth

This variable is the trade-weighted average of the change in the real GDP growth rate between 2007 and 2009 in the top ten trading partners of each country. We construct

trade weights using 2007 bilateral exports plus imports from the IMF Direction of Trade Statistics (DOTS).

Table 1: Country List

Advanced	Emerging
Australia	Argentina
Austria	Brazil
Belgium	Chile
Canada	China
Denmark	Colombia
Finland	Czech Republic
France	Egypt
Germany	Estonia
Greece	Hong Kong
Iceland	Hungary
Ireland	India
Italy	Indonesia
Japan	Israel
Netherlands	Korea
New Zealand	Latvia
Norway	Lithuania
Portugal	Malaysia
Spain	Mexico
Sweden	Pakistan
Switzerland	Peru
United Kingdom	Philippines
United States	Poland
	Russia
	Singapore
	Slovak Republic
	Slovenia
	South Africa
	Thailand
	Turkey
	Venezuela

Table 2: Fiscal balance shift in comparative perspective

Period	Mean	S. D.
1973-1975	-3.3	2.1
1975-1977	0.9	2.0
1977-1979	-0.9	1.7
1979-1981	-1.6	2.6
1981-1983	-0.6	2.2
1983-1985	0.8	2.5
1985-1987	1.2	2.7
1987-1989	0.6	2.5
1989-1991	-1.5	2.5
1991-1993	-1.8	3.0
1993-1995	1.0	2.9
1995-1997	3.3	2.2
1997-1999	1.2	1.6
1999-2001	0.2	2.2
2001-2003	-1.5	2.0
2003-2005	1.4	2.7
2005-2007	1.3	1.5
2007-2009	-7.1	4.1

Note: These statistics are computed using the Advanced country sample. Data are from the OECD Economic Outlook No. 86 and No. 80.

Table 3: Fiscal balance shift in comparative perspective

Country	2007-2009	1973-2007 min	mean	max
Australia	-5.7	-4.1	0.1	3.0
Austria	-3.6	-3.6	-0.1	3.9
Belgium	-5.5	-7.0	0.3	4.5
Canada	-6.4	-5.3	0.1	5.5
Denmark	-6.9	-6.8	0.0	6.2
Finland	-7.5	-7.7	0.0	5.1
France	-5.4	-3.5	-0.2	2.1
Germany	-3.4	-6.7	-0.1	7.0
Greece	-8.7	-5.6	-0.2	3.2
Iceland	-21.1	-3.6	0.3	7.7
Ireland	-12.4	-7.3	0.2	5.9
Italy	-4.0	-3.9	0.3	4.7
Japan	-4.8	-4.2	-0.2	4.2
Netherlands	-4.6	-6.4	0.0	8.0
New Zealand	-6.2	-1.4	0.7	3.2
Norway	-8.0	-6.0	0.7	7.8
Portugal	-4.0	-4.1	0.0	3.8
Spain	-11.5	-2.5	0.0	4.0
Sweden	-5.7	-11.1	-0.1	6.9
Switzerland	-2.4	-1.7	0.4	2.4
United Kingdom	-9.9	-4.6	0.1	3.6
United States	-8.4	-5.0	-0.1	3.0

Note: Data are from the OECD Economic Outlook No. 86 and No. 80.

Table 4: Descriptive statistics: advanced countries

Variable	Upper mean	Upper median	Lower mean	Lower median	Difference
(1) Fiscal balance	-11.2	-9.9	-3.8	-3.8	7.4***
(2) Expenditure	1.8	15.4	8.1	6.6	6.2
(3) Revenue	-21.7	-12.7	-0.8	-1.7	20.9**
(4) Structural balance	-7.9	-5.7	-2.1	-1.9	5.8**
(5) Fiscal stimulus	-0.4	1.1	1.6	1.1	2.0
(6) GDP growth	-3.5	-2.8	-1.7	-1.9	1.8
(7) Unemployment rate	4.4	4.6	0.7	0.7	-3.8***
(8) GDP per capita	40.2	40.9	35.5	36.4	-4.7*
(9) Debt/GDP	50.1	44.1	55.7	59.5	5.6
(10) Openness	56.4	56.5	81.4	86.8	25.0
(11) Country size	61.7	11.1	36.8	21.6	-24.9
(12) Exchange rate regime	0.6	1.0	0.3	0.0	-0.3
(13) Credit growth	56.6	37.8	13.9	14.8	-42.7**
(14) Current account	-5.7	-5.3	2.8	3.1	8.5**
(15) Fiscal rule	0.6	1.0	0.9	1.0	0.3
(16) Political constraints	0.7	0.8	0.8	0.8	0.1*
(17) Bond yield	-0.5	-0.7	-0.7	-0.6	-0.1
(18) Rating downgrade	-1.6	0.0	0.0	0.0	1.6
(19) Real exchange rate	-8.2	-2.6	1.4	0.4	9.6*
(20) Banking crisis	0.7	1.0	0.4	0.0	-0.3
(21) IMF program	0.1	0.0	0.0	0.0	-0.1
(22) ROW growth	-6.7	-6.5	-6.6	-6.7	0.1
(23) Change in current account	4.8	2.4	-1.2	-1.3	-6.1**

Note: Upper group (ordered from the largest general government balance deterioration) is formed by Iceland, Spain, Ireland, Greece, United States, United Kingdom and Norway. Lower group (ordered from the smallest general government balance deterioration) is formed by Switzerland, Austria, Germany, Italy, France, Netherlands and Australia. *, ** and *** indicate if the differences between the means in Upper and Lower groups are statistically significant at 10%, 5% and 1%, respectively.

Table 5: Descriptive statistics: broad sample

Variable	Upper mean	Upper median	Lower mean	Lower median	Difference
(1) Fiscal balance	-10.2	-8.3	-2.0	-2.3	8.2***
(2) Expenditure	12.7	13.7	4.6	5.3	-8.1
(3) Revenue	-17.3	-12.7	-3.5	-2.2	13.8**
(4) GDP growth	-4.6	-2.8	2.5	2.5	7.1***
(5) Unemployment rate	3.8	2.2	0.7	0.4	-3.1***
(6) GDP per capita	32.7	33.9	16.0	10.3	-16.7***
(7) Debt/GDP	44.6	34.1	52.5	47.8	7.8
(8) Openness	109.4	75.6	73.9	65.1	-35.0
(9) Country size	46.8	7.0	152.8	69.7	106.0
(10) Exchange rate regime	0.5	1.0	0.7	1.0	0.2
(11) Credit growth	31.3	29.1	3.8	4.9	-27.5**
(12) Current account	-1.4	-2.7	2.5	2.3	3.8
(13) Fiscal rule	0.6	1.0	0.8	1.0	0.2
(14) Political constraints	0.7	0.8	0.6	0.7	-0.1*
(15) Bond yield	1.2	-0.3	-0.1	-0.5	-1.3
(16) Rating downgrade	-1.1	0.0	-0.1	0.0	1.0*
(17) Real exchange rate	0.5	2.8	0.8	0.0	0.3
(18) Banking crisis	0.3	0.0	0.1	0.0	-0.2**
(19) IMF program	0.1	0.0	0.3	0.0	0.2*
(20) ROW growth	-7.3	-6.5	-6.4	-6.4	0.9*
(21) Change in current account	4.2	2.2	-0.2	-0.5	-4.4*
(22) IFI	680.7	360.1	260.3	132.2	-420**

Note: Upper group (ordered from the largest general government balance deterioration) is formed by Iceland, Singapore, Spain, Chile, Russia, Ireland, Greece, United States, Latvia, United Kingdom, Norway, Japan, Lithuania, Denmark, Finland, South Africa and Hong Kong. Lower group (ordered from the largest general government balance improvement) is formed by Hungary, Pakistan, Egypt, Indonesia, Brazil, Switzerland, Colombia, Argentina, Philippines, Austria, Mexico, Thailand, Malaysia, Germany, Italy, Turkey and China. *, ** and *** indicate if the differences between the means in Upper and Lower groups are statistically significant at 10%, 5% and 1%, respectively.

Table 6: Advanced countries.

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP growth	0.43*	0.12	0.09	0.11	0.10	0.17	0.09	0.13	0.15	0.06
	(0.22)	(0.18)	(0.20)	(0.18)	(0.21)	(0.21)	(0.18)	(0.16)	(0.18)	(0.16)
Unemployment Rate		-1.05***	-1.09***	-0.99***	-0.47***	-1.02***	-1.04***	-1.02***	-1.02***	-0.56***
		(0.22)	(0.22)	(0.20)	(0.16)	(0.17)	(0.18)	(0.24)	(0.17)	(0.17)
Debt / GDP			-0.01							
			(0.01)							
Openness				1.25						
				(0.97)						
CA / GDP					0.09					
					(0.11)					
Credit growth					-4.92**					-5.52***
					(1.91)					(1.85)
Exchange rate regime						-0.90				
						(1.33)				
Country size							0.65			
							(0.53)			
Political constraints								9.43***		7.70**
								(2.10)		(2.68)
Fiscal rule									1.85	
									(1.95)	
Constant	-5.93***	-4.53***	-4.10***	-9.91**	-4.47***	-4.02***	-6.44***	-11.84***	-5.93***	-10.21***
	(0.92)	(0.86)	(0.92)	(4.15)	(0.72)	(1.25)	(1.88)	(1.39)	(1.99)	(1.82)
Observations	22	22	22	22	22	22	22	22	22	22
R^2	0.12	0.54	0.55	0.58	0.75	0.56	0.61	0.61	0.59	0.77

Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively.

Table 7: Advanced countries. Additional variables.

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)
GDP growth	0.16	-0.05	0.16	0.12
	(0.23)	(0.16)	(0.18)	(0.17)
Unemployment rate	-1.06***	-0.94***	-0.92***	-1.06***
	(0.21)	(0.14)	(0.11)	(0.21)
Bond yield	0.87			
	(1.78)			
Rating downgrade		-4.04**		
		(1.55)		
Real exchange rate			10.29	
			(6.75)	
Banking crisis				0.15
				(0.96)
Constant	-3.86*	-4.57***	-4.51***	-4.56***
	(2.07)	(0.80)	(0.82)	(0.99)
Observations	22	22	22	22
R^2	0.56	0.70	0.64	0.54

Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively.

Table 8: Broad sample.

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
GDP growth	0.19***	0.03	-0.18**	-0.18**	-0.18**	-0.19*	-0.15**	-0.18*	-0.15	-0.25***	-0.21**
	(0.06)	(0.08)	(0.09)	(0.09)	(0.09)	(0.11)	(0.08)	(0.10)	(0.10)	(0.08)	(0.08)
Unemployment rate		-0.56**	-0.77***	-0.74***	-0.76***	-0.76***	-0.78***	-0.72***	-0.76***	-0.94***	-0.75***
		(0.22)	(0.16)	(0.17)	(0.16)	(0.15)	(0.15)	(0.24)	(0.17)	(0.14)	(0.16)
GDP per capita			-2.99***	-3.01***	-3.04***	-2.89***	-3.11***	-2.16***	-3.56***	-2.94***	-2.13*
			(0.69)	(0.70)	(0.69)	(0.58)	(0.73)	(0.68)	(0.89)	(0.61)	(1.17)
DEBT / GDP				0.00							
				(0.02)							
Openness					0.22						
					(0.79)						
Country size						0.13					
						(0.45)					
Exchange rate regime							-1.27				
							(0.95)				
CA / GDP								-0.14			
								(0.10)			
Credit growth								-5.99***			
								(1.97)			
Political constraints									4.08		
									(2.99)		
Fiscal rule										2.02	
										(1.29)	
IFI											-1.96
											(1.66)
Constant	-5.77***	-4.80***	25.11***	25.08***	24.59***	23.62***	27.09***	17.60**	27.93***	23.62***	17.84
	(0.51)	(0.52)	(6.85)	(6.96)	(7.55)	(5.86)	(7.59)	(6.59)	(7.91)	(5.89)	(10.79)
Observations	52	52	52	52	52	52	52	51	50	40	52
R^2	0.12	0.20	0.41	0.41	0.41	0.41	0.43	0.51	0.44	0.54	0.42

Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively.

Table 9: Broad sample. Additional variables.

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)	(5)
GDP growth	-0.18**	-0.20**	-0.17**	-0.18**	-0.18*
	(0.09)	(0.09)	(0.08)	(0.09)	(0.09)
Unemployment rate	-0.77***	-0.73***	-0.75***	-0.75***	-0.76***
	(0.17)	(0.16)	(0.15)	(0.16)	(0.16)
GDP per capita	-2.97***	-3.11***	-2.86***	-2.92***	-3.03***
	(0.68)	(0.76)	(0.67)	(0.78)	(1.01)
Bond yield	0.02				
	(0.12)				
Rating downgrade		-1.07			
		(1.81)			
Real exchange rate			4.35		
			(4.76)		
Bank crisis				-0.28	
				(1.27)	
IMF program					-0.14
					(1.82)
Constant	24.93***	26.33***	23.75***	24.38***	25.52**
	(6.74)	(7.57)	(6.65)	(7.68)	(10.27)
Observations	52	52	52	52	52
R^2	0.41	0.42	0.43	0.41	0.41

Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively.

Table 10: Advanced countries (structural balance).

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP growth	0.24	-0.05	-0.04	-0.06	-0.14	0.04	-0.10	-0.05	-0.00	-0.17
	(0.26)	(0.18)	(0.23)	(0.18)	(0.17)	(0.24)	(0.17)	(0.18)	(0.20)	(0.15)
Unemployment Rate		-1.02***	-0.99***	-0.94***	-0.15	-0.97***	-1.00***	-1.01**	-0.97***	-0.20
		(0.36)	(0.34)	(0.32)	(0.19)	(0.27)	(0.26)	(0.37)	(0.26)	(0.20)
Debt / GDP			0.00							
			(0.02)							
Openness				1.57						
				(1.29)						
CA / GDP					0.05					
					(0.07)					
Credit growth					-9.12***					-9.66***
					(2.73)					(2.68)
Exchange rate regime						-1.67				
						(1.83)				
Country size							1.13			
							(0.81)			
Political constraints								3.64***		0.62
								(1.00)		(2.08)
Fiscal rule									3.29	
									(2.65)	
Constant	-3.37***	-2.01***	-2.25**	-8.76	-1.65***	-1.07	-5.32**	-4.83***	-4.50**	-1.99
	(0.59)	(0.53)	(0.91)	(5.42)	(0.47)	(1.30)	(2.30)	(0.79)	(2.14)	(1.52)
Observations	22	22	22	22	22	22	22	22	22	22
R^2	0.03	0.37	0.37	0.42	0.80	0.41	0.55	0.38	0.50	0.79

Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively.

Table 11: Advanced countries (structural balance). Additional variables.

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)
GDP growth	0.03	-0.27	0.01	-0.06
	(0.26)	(0.17)	(0.17)	(0.17)
Unemployment Rate	-1.04***	-0.88***	-0.79***	-0.96***
	(0.34)	(0.21)	(0.14)	(0.33)
Bond yield	1.85			
	(2.27)			
Rating downgrade		-5.08		
		(3.02)		
Real exchange rate			18.24*	
			(10.33)	
Banking crisis				-0.64
				(1.16)
Constant	-0.59	-2.06***	-1.97***	-1.87**
	(2.18)	(0.68)	(0.46)	(0.70)
Observations	22	22	22	22
R^2	0.45	0.58	0.64	0.38

Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively.

Table 12: Instrumental variables regressions. Advanced countries.

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP growth	-0.27	-0.41*	-0.35	-0.33	-0.24	-0.38	-0.41*	-0.26	-0.38	-0.24
	(0.40)	(0.25)	(0.23)	(0.21)	(0.20)	(0.26)	(0.22)	(0.18)	(0.27)	(0.17)
Unemployment Rate		-1.04**	-0.97***	-1.01***	-0.60**	-1.07***	-1.13***	-1.18**	-0.96***	-0.73**
		(0.43)	(0.33)	(0.39)	(0.26)	(0.38)	(0.38)	(0.46)	(0.29)	(0.31)
Debt / GDP			-0.01							
			(0.01)							
Openness				1.49						
				(1.05)						
CA / GDP					0.05					
					(0.09)					
Credit growth					-5.73***					-5.58***
					(1.81)					(2.09)
Exchange rate regime						-0.05				
						(1.44)				
Country size							0.74			
							(0.55)			
Political constraints								9.27***		7.50***
								(2.51)		(2.38)
Fiscal rule									1.57	
									(2.24)	
Constant	-8.08***	-6.21***	-5.58***	-12.25**	-5.02***	-6.01***	-8.06***	-12.55***	-7.50***	-10.58***
	(1.27)	(1.03)	(1.25)	(5.02)	(0.70)	(1.32)	(1.72)	(2.19)	(1.64)	(1.78)
Observations	22	22	22	22	22	22	22	22	22	22

Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively. GDP growth and unemployment rate are instrumented with 2007 values of: share of manufacturing on GDP, trade openness, GDP per capita, temporary/permanent employment ratio, unemployment rate, index for strictness of the employment legislation and log level of employment.

Table 13: Instrumental variables regressions. Advanced countries (structural balance).

$\left(\frac{Gov.Bal}{GDP}\right)_{09} - \left(\frac{Gov.Bal}{GDP}\right)_{07}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP growth	-0.35	-0.50**	-0.41**	-0.41**	-0.34*	-0.37*	-0.51**	-0.40**	-0.43*	-0.35**
	(0.37)	(0.23)	(0.19)	(0.20)	(0.19)	(0.21)	(0.23)	(0.20)	(0.24)	(0.17)
Unemployment Rate		-1.05*	-0.90**	-1.01*	-0.47	-1.03**	-1.17**	-1.15*	-0.91**	-0.49
		(0.62)	(0.45)	(0.57)	(0.38)	(0.53)	(0.53)	(0.67)	(0.40)	(0.44)
Debt / GDP			0.00							
			(0.01)							
Openness				1.70						
				(1.12)						
CA / GDP					0.01					
					(0.06)					
Credit growth					-8.73***					-8.84***
					(2.80)					(2.91)
Exchange rate regime						-1.03				
						(1.51)				
Country size							1.19			
							(0.78)			
Political constraints								3.50*		0.60
								(2.09)		(1.93)
Fiscal rule									3.07	
									(2.62)	
Constant	-5.20***	-3.32***	-3.45***	-10.23**	-1.67***	-2.50***	-6.38***	-5.47***	-5.78***	-2.10
	(1.36)	(0.70)	(1.20)	(5.06)	(0.58)	(0.96)	(2.19)	(1.75)	(2.15)	(1.55)
Observations	22	22	22	22	22	22	22	22	22	22

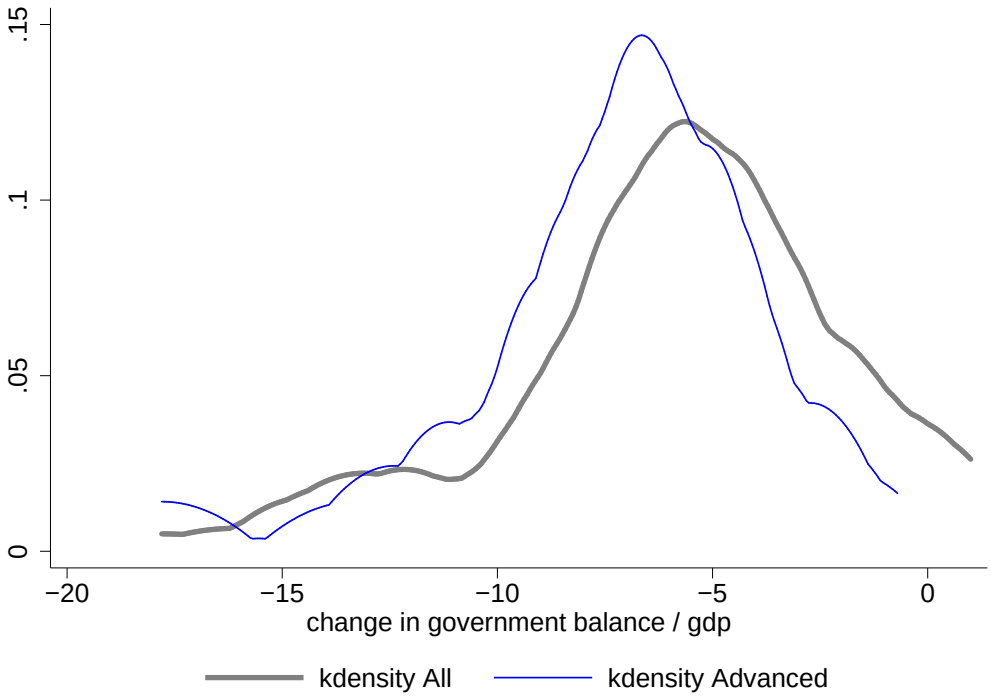
Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively. GDP growth and unemployment rate are instrumented with 2007 values of: share of manufacturing on GDP, trade openness, GDP per capita, temporary/permanent employment ratio, unemployment rate, index for strictness of the employment legislation and log level of employment.

Table 14: Pooled regression. Advanced countries.

$\left(\frac{Gov.Bal}{GDP}\right)_t - \left(\frac{Gov.Bal}{GDP}\right)_{t-2}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP growth	0.67***	0.32***	0.42***	0.21	0.44***	0.26*	0.50***	0.29**	0.51***	0.31**
	(0.07)	(0.10)	(0.06)	(0.13)	(0.06)	(0.14)	(0.07)	(0.14)	(0.07)	(0.14)
Unemployment Rate			-1.05***	-0.70**	-0.97***	-0.59*	-0.76***	-0.52*	-0.78***	-0.56*
			(0.17)	(0.30)	(0.17)	(0.30)	(0.16)	(0.31)	(0.16)	(0.31)
Debt / GDP					0.01*	0.01	0.01*	0.02**	0.02**	0.03**
					(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
CA / GDP							0.10	0.07	0.08	0.05
							(0.06)	(0.07)	(0.06)	(0.07)
Credit growth							-0.14	1.26	0.09	1.49
							(1.40)	(1.00)	(1.47)	(1.01)
Political constraints									5.13*	4.62*
									(2.59)	(2.50)
Crisis		-4.55***		-3.67***		-1.71		0.10		1.24
		(1.06)		(1.03)		(1.47)		(1.37)		(3.78)
Crisis*GDP growth		0.11		-0.08		-0.17		-0.31		-0.33
		(0.24)		(0.21)		(0.22)		(0.251)		(0.24)
Crisis*Unemployment Rate				-0.36		-0.54		-0.09		-0.06
				(0.37)		(0.38)		(0.34)		(0.35)
Crisis*Debt / GDP						-0.03*		-0.04***		-0.05***
						(0.01)		(0.01)		(0.02)
Crisis*CA / GDP								-0.04		-0.04
								(0.12)		(0.12)
Crisis*Credit growth								-7.41***		-7.63***
								(1.88)		(2.00)
Crisis*Political constraints										-0.91
										(3.86)
Constant	-3.73***	-1.36**	-2.40***	-0.81	-3.38***	-1.97*	-3.76***	-2.75**	-8.20***	-6.92**
	(0.44)	(0.60)	(0.32)	(0.66)	(0.57)	(1.12)	(0.65)	(1.16)	(2.40)	(2.71)
R^2	0.56	0.65	0.67	0.74	0.68	0.75	0.70	0.79	0.72	0.80
Observations	88	88	88	88	88	88	88	88	88	88

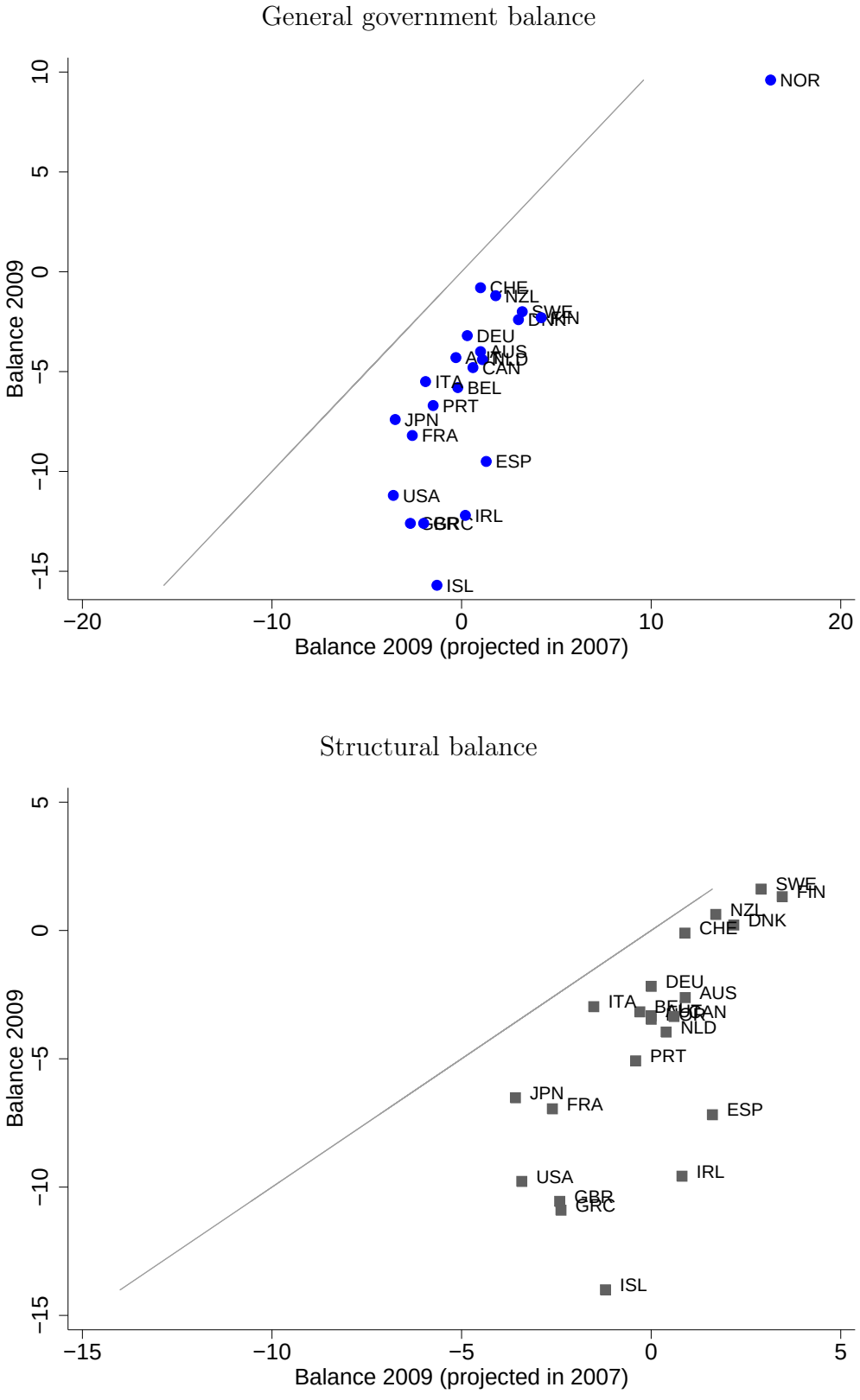
Note: Robust standard errors in parentheses. ***, ** and * indicate significant at 1%, 5% and 10% respectively. Regressions estimated with data for the following subperiods: 2001-03, 2003-05, 2005-07 and 2007-09. 'Crisis' is a dummy variable taking value one in 2007-09 and zero otherwise.

Figure 1: Shift in general government fiscal balance.



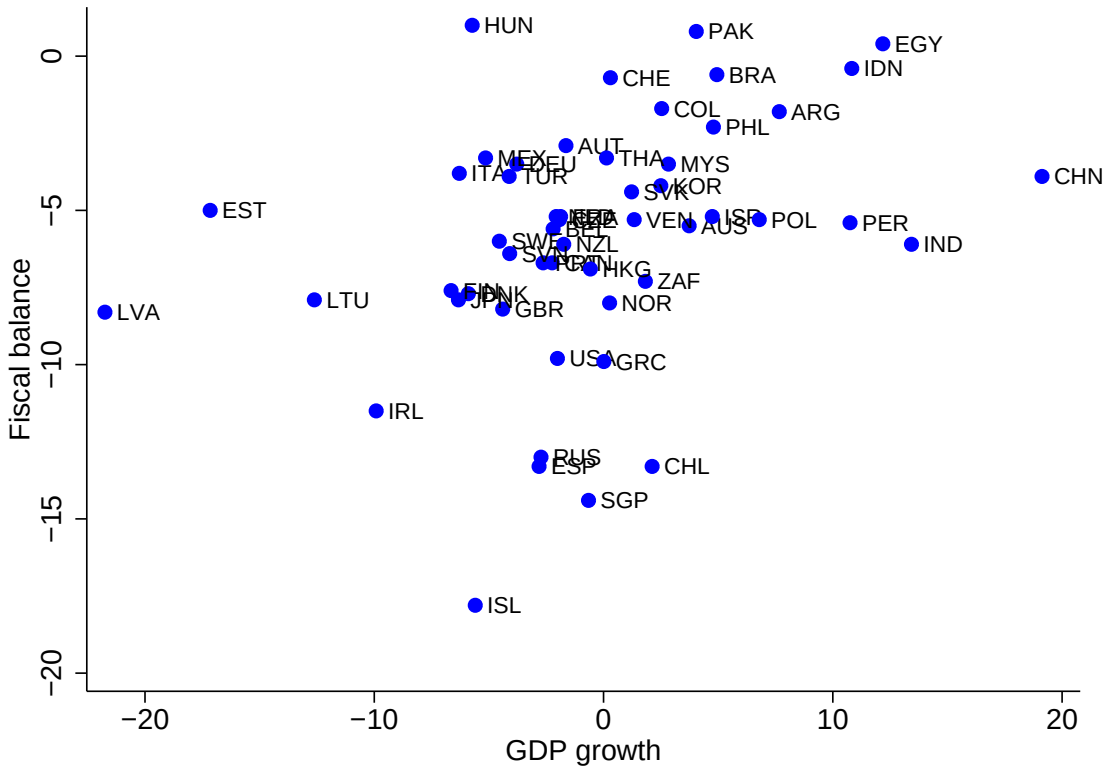
Note: Fiscal balance is the difference in general government balance scaled by GDP between 2007 and 2009. Density functions are obtained through a kernel density estimation using an Epanechnikov kernel function.

Figure 2: Actual vs. projected fiscal balance



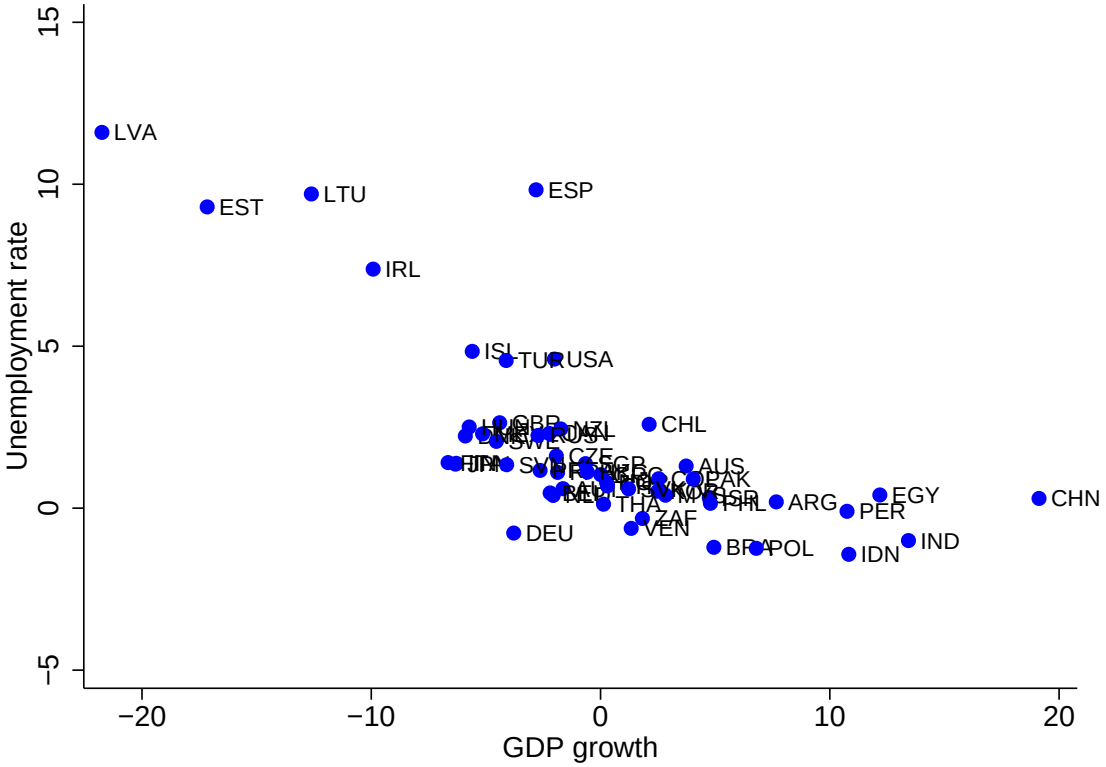
Note: Fiscal balances are scaled by GDP.

Figure 3: Fiscal balance change and output growth: 2007-2009



Note: Fiscal balance stands for the difference in general government balance scaled by GDP between 2007 and 2009. GDP growth is the 2007-2009 growth in real GDP.

Figure 4: Unemployment rate change and output growth: 2007-2009



Note: Unemployment rate stands for the difference in the unemployment rate between 2007 and 2009. GDP growth is the 2007-2009 growth in real GDP.